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S. R. A.—Fed. Hort. Bd. 21. Issued December 4, 1915.

U. S. DEPARTMENT OF AGRICULTURE,

FEDERAL HORTICULTURAL BOARD.

C. L. Marlatt, *Chairman;* W. A. Orton, George B. Sudworth, W. D. Hunter, Karl F. Kellerman. R. C. Althouse, *Secretary.*

SERVICE AND REGULATORY ANNOUNCEMENTS.

OCTOBER, 1915.

INSTRUCTIONS RELATIVE TO REPORTING RESHIPMENTS OF IMPORTED COTTON.

Dear Sirs: Regulation 10 of the Rules and Regulations Governing the Importation of Cotton Lint into the United States stipulates that a licensee who has received cotton from a permittee shall not make subsequent shipments of such cotton, except to a person, firm, or corporation holding an unrevoked license for the purchase and use of imported cotton, and then only after giving the notice prescribed by Regulation 8, entitled "Permittee's Notice of Shipment of Imported Cotton." This notice, among other things, calls for the permit number and the port of entry for the cotton described therein. Realizing that this information is not ordinarily available to the licensee, a form for the reporting of reshipments by licensees, entitled "Licensee's Notice of Reshipment of Imported Cotton," has been prepared, and a small supply is inclosed herewith. Additional copies may be obtained either from this office or from our inspectors at the ports of New York and Boston. It will be noted that in place of the permit number and port of entry this form calls for the name and address of the person from whom the cotton is purchased, the date of purchase, and the place from which the cotton is reshipped. In all other respects the two forms are substantially alike. Cotton thus reshipped by licensees at New York and Boston is to be reported to our inspectors at those ports, as well as to the Federal Horticultural Board. Cotton shipped from other points need be reported only to the Federal Horticultural Board. Licensees who are also permittees should be careful not to confuse these two forms.

While probably only a comparatively small proportion of licensees make reshipments of imported cotton to other licensees, this letter is sent to all licensees, in order that they may be kept fully advised of our requirements.

Yours very truly,

R. C. Althouse,
Secretary of Board.

October 14, 1915.

INSTRUCTIONS REGARDING BURNING OF PICKER WASTE.

Dear Sirs: The burning of picker waste, as shall be directed by the Federal Horticultural Board, is a requirement of regulation 10 of the Rules and Regu-

lations Governing the Importation of Cotton Lint into the United States. The following specific directions regarding such burning are now given to all users of such imported cotton.

The picker waste should be collected as it accumulates or at the end of each day with absolute thoroughness so as to leave no scattered waste, and should be burned during the day or at the close of each day's run. The recommended plan is to have the waste conducted as it accumulates through an iron chute directly to the furnace. If this is not possible the waste should be placed in paper or cloth sacks or baskets with covers and delivered to the furnace for immediate burning. No waste should be accumulated and left in the furnace room for more than one day, and until it is burned is to be kept in tight bags or covered containers. If there is any likelihood of several hours' delay in burning in the furnace room, it is advised that the waste be kept in the picker room until it can be burned as soon as it is delivered to the furnace. If picker waste goes into a pit or receiving room the same precautions should be used in the prompt removal from such receiving chamber and burning.

Yours very truly,

C. L. MARLATT,
Chairman of Board.

OCTOBER 15, 1915.

A METHOD OF FUMIGATING BALED COTTON.

DEAR SIRS: The accompanying manuscript on "A Method of Fumigating Baled Cotton" has been prepared for the information of those contemplating the erection of cotton vacuum fumigation plants. In addition to describing the apparatus which has been used in an experimental way in Washington, suggestions are also made relative to the construction of commercial plants.

Yours very truly,

C. L. MARLATT,
Chairman of Board.

OCTOBER 18, 1915.

In order to prevent the introduction and establishment of the pink boll worm (*Gelechia gossypiella*) and other injurious insects, all cotton lint, baled or unbaled, grown in any foreign country or locality, is subject to all the provisions of sections 1, 2, 3, and 4 of the Plant Quarantine Act.

Amendment 3 to regulation 6 of the Rules and Regulations Governing the Importation of Cotton Lint into the United States requires the disinfection of all cotton imported on and after February 1, 1916.[1]

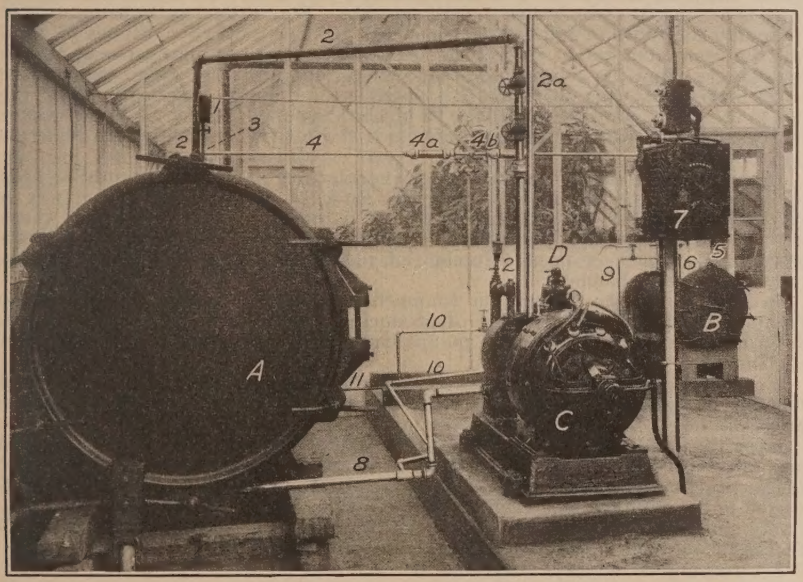
This disinfection shall consist in fumigating the bales with hydrocyanic-acid gas in an air-tight chamber in the presence of a partial vacuum, at the rate of 3 ounces of cyanide per 100 cubic feet, with an exposure of not less than 45 minutes. Further information on the method of fumigation is given below.

DESCRIPTION OF APPARATUS USED BY THE FEDERAL HORTICULTURAL BOARD.

An apparatus (see figure) meeting in a small experimental way the above requirements has been devised and operated successfully in Washington and is herein described for the benefit of persons considering the construction of commercial plants. Some additional suggestions are made in relation to such larger plants. Briefly, this apparatus consists of a fumigation chamber or retort (A), an auxiliary chamber or generator (B) for the generation of the gas, and an air pump (C). An additional air pump (D) is also a part of this apparatus, although not necessary for cotton fumigation. One end of the fumigation chamber or retort is permanently closed, while the other end is provided with a heavy iron door swung on a hinge and held in place by

[1] See S. R. A., Fed. Hort. Bd. 19, August, 1915, p. 57.

six clamps. The gasket which is embedded in the door comes in close contact with the flange of the retort, and when properly greased and clamped prevents air from entering the chamber during an exposure. This retort lies with its longest axis in a horizontal position. On the upper side of the retort there are four openings: The one nearest the door (1) is provided with a vacuum gauge, which registers the degrees in pressure in units equivalent to inches of mercury; the second opening (2) is fitted to an exhaust pipe which is attached to the air pump (C), the exhaust leaving the pump at 2*a*; the third opening (3) is used to permit the air to enter the chamber at the completion of an experiment, while the fourth opening (4) is fitted to a pipe which leads to the auxiliary tank or generator (B) in which the gas is generated. The pipe leading from the fourth opening to the auxiliary or generator is provided with a gas cock and three enlargements, 4*a*, 4*b*, and 4*c* (the latter is not shown in the photograph). Two of these enlargements contain sodium cyanide, and the third glass wool. The object of the sodium cyanide and glass wool is to pick up any free sulphuric acid which may be mechanically drawn from the generator when the gas is permitted to enter the fumigation chamber. The auxiliary or generator (B) is so arranged that it can be used as a generating



Vacuum Fumigation Apparatus.

tank or as a fumigating chamber, by closing the gas cock just above the cylinder. The exhaust pipe which leads from the generator to the small vacuum pump (D) is shown as figure 9. No. 5 is a tubulature used in introducing the chemicals into the generator. No. 8 is a pipe which carries water to cool the air pump (C), and No. 10 is the cooling pipe for the small air pump (D). No. 11 is the pipe which carries the exhaust from the small air pump, and No. 6 is a combination pressure and vacuum gauge. No. 7 is a rheostat.

The cotton to be fumigated is placed in the retort (A), the door closed and clamped, and the air exhausted until the gauge registers about 26 inches; that is, the air in the chamber is exhausted until the pressure is the equivalent of about 5 inches of mercury. At this stage the suction is cut off, and the gas is generated in the auxiliary chamber (B) and introduced into the fumigation chamber through the pipe (4). It has been found advantageous to produce a partial vacuum in only the large retort, and the gas is generated in the generator in the presence of a normal atmospheric pressure. The gas may be generated in one of two ways. The cyanide may be placed in the jar within the generator, the door closed, and the acid and water introduced through the tubulature (5), or the acid may be placed in the jar within the generator and

the cyanide in solution introduced through the tubulature (5). The latter method is preferable, especially where a glass tubulature is employed, as it eliminates all possibility of breakage of glass by the heat generated from the combination acid and water. In fact, to prevent breakage, it has been found advisable to cool the acid and water, which reduces the yield of gas. Where the cyanide in solution is introduced through the tubulature, no heat is generated until the solution comes in contact with the acid in the generator. This method has an additional advantage in that the yield of gas is increased. As soon as the generation begins, the gas cock above the auxiliary is opened and the gas is pulled over by the small amount of air remaining in the auxiliary. The gauge of the retort drops approximately 1 inch after the air and gas have entered from the generator. The cotton is held in this chamber for 45 minutes in the presence of a vacuum of 25 inches, and at the expiration of that time the gas cock (3) on the top of the retort is opened and the air is allowed to rush into the retort until the gauge registers zero. At this point the stop cock is instantly shut off, and the cotton held for another 45 minutes in the presence of gas and the normal atmospheric pressure. At the completion of this last exposure the vacuum pump is started and the air and gas exhausted until the gauge registers 25 inches. The air is again allowed to enter the tank, and the tank is evacuated to 25 inches the second time. While the door is being opened the pump continues to run with the gas cock (3) open, which continues to wash out the remaining gas in the retort. If possible, it is very desirable in removing the gas from the retort to continue operations until the gauge registers 20 to 29 inches. By this operation it is possible to eliminate practically all of the gas in the retort, and, in fact, where 29 inches are pulled, it may not be necessary to repeat the operation a second time, as is the case where the gauge registers only 25 inches.

In erecting a plant to comply with the regulations it is very essential to bear in mind that the fumigation chamber must be constructed to support a vacuum of not less than 25 inches for 45 minutes. Cylinders such as those used by wood-preserving plants can be adapted to this process, and those interested in the construction of a fumigation plant will find it to their advantage to examine such chambers.

In addition to the fumigation chamber it is also necessary to provide the plant with an air pump capable of producing a vacuum of 25 inches or more. Information relative to vacuum pumps can be secured from manufacturers of such pumps.

A generator must be provided of sufficient size to generate the required amount of hydrocyanic-acid gas. Information on the construction of generators can be secured from the wholesale dealers in cyanide and other chemicals.

Experiments are now under way to determine the effect of hydrocyanic-acid gas, in the presence of a partial vacuum, on various insects in cotton at different temperatures. The results thus far secured seem to indicate that cotton fumigation is not effective at a temperature less than 75° F. It will be a comparatively simple undertaking to provide the retort with a heating system and this feature should not be overlooked in the erection of a plant.

Hydrocyanic-acid gas is generated by combining potassium or sodium cyanide, sulphuric acid, and water. Potassium cyanide should be guaranteed to be 98 per cent to 99 per cent pure, and sodium cyanide should be guaranteed to contain not less than 51 per cent cyanogen. Commercial sulphuric acid, 66° Baumé, which is approximately 93 per cent pure, is satisfactory for the generation of this gas. Recent experiments have demonstrated the desirability of using the cyanide in solution. Cyanide is soluble in water and can easily be dissolved.

Where cyanide is used in quantities it may be desirable to recover the cyanide from the gas by passing the exhaust over a caustic soda solution. Furthermore, it is possible to manufacture prussian blue from the exhaust by passing it through a solution of copperas. In case the exhaust is used to manufacture either of the above products, all possibility of injury from the exhaust to operators of the plants is removed. This gas may also be disposed of by pumping the exhaust into a furnace fire, if the proper precautions are taken to prevent sparks of fire from reaching the fumigation chamber.

The impression seems to prevail that, owing to the poisonous nature of hydrocyanic-acid gas, it is unsafe to use. This is not true where the gas is intelligently employed and the proper precautions exercised. As indicated in the preceding paragraph, the exhaust gas should be thoroughly safeguarded and under no condition should it be permitted to escape in the inclosure where the actual operation takes place. The retort and its accessories should be frequently

tested for leakage. Hydrocyanic-acid gas has been in general and safe use for the past 30 years to control insects infesting citrus trees, nursery stock, stored products, and dwelling houses.

E. R. Sasscer,
Chief Inspector, Federal Horticultural Board.

The honorable the Postmaster General.

Sir: The following list of plants and plant products, submitted by Mr. M. L. Dean, State horticulturist of Montana, Missoula, Mont., is approved for the State of Montana, under the act of March 4, 1915, and in accordance with Postal Order No. 8760, issued April 2, 1915: "All florists' stock, trees, shrubs, vines, cuttings, grafts, scions, buds, fruit pits, and other seeds of fruit and ornamental trees or shrubs, and other plants and plant products in the raw or unmanufactured state, except vegetable and flower seeds; and all insect enemies and plant diseases of such plants and plant products: *Provided*, That this list of plants shall not apply to plants shipped under the certificate of the United States Department of Agriculture for propagation in the plant introduction and field work of the Division of Forestry or Government Experiment Station work in Montana."

All insect enemies and plant diseases of the plants and plant products referred to above are covered in lieu of a specifically enumerated list.

Inspection service is maintained at the following points: Miles City, Terry, Bridger, Edgar, Joliet, Fromberg, Baker, Belfry, Glendive, Livingston, Lodgegrass, Billings, Park City, Columbus, Laurel, Helena, Dillon, Butte, Bozeman, Harlowton, Great Falls, Lewistown, Glasgow, Havre, Mondak, Plentywood, Dooley, Bainville, Anaconda, Missoula, Hamilton, Woodside, Como, Stevensville, Bigfork, Kalispell, Somers, Eureka, Troy, Plains, and Red Lodge.

Very respectfully,

D. F. Houston,
Secretary of Agriculture.

October 15, 1915.

Office of Third Assistant Postmaster General,
Washington, October 21, 1915.

The State of Montana has established places for the terminal inspection of plants and plant products under the provisions of the act of March 4, 1915, embodied in section 478¼, Postal Laws and Regulations, appearing on page 49 of the May, 1915, Supplement to the Postal Guide.

All postmasters are, therefore, informed that packages containing plants or plant products addressed to places in the State of Montana may be accepted for mailing only when plainly marked so that the contents may be readily ascertained by an inspection of the outside thereof. The law makes the failure so to mark such packages an offense punishable by a fine of not more than $100.

The plants and plant products subject to terminal inspection in the State of Montana are described as follows:

"All florists' stock, trees, shrubs, vines, cuttings, grafts, scions, buds, fruit pits, and other seeds of fruit and ornamental trees or shrubs and other plants and plant products in the raw or unmanufactured state, except vegetable and flower seeds: *Provided*, That this list of plants shall not apply to plants shipped under the certificate of the United States Department of Agriculture for propagation in the plant introduction and field work of the Division of Forestry or Government Experiment Station work in Montana.

Postmasters within the State of Montana shall be governed strictly by the provisions of paragraphs 3, 4, 5, and 6, section 478¼, Postal Laws and Regulations, in the treatment of all packages addressed for delivery at their offices containing any plants or plant products above described as subject to terminal inspection.

The place to which a postmaster in the State of Montana shall send for inspection, after receiving the required postage therefor, under the provisions of section 478¼, Postal Laws and Regulations, a package containing plants or plant products subject to terminal inspection is the one in the list below which is nearest to his office:

Anaconda.	Eureka.	Lodgegrass.
Bainville.	Fromberg.	Miles City.
Baker.	Glasgow.	Missoula.
Belfry.	Glendive.	Mondak.
Bigfork.	Great Falls.	Park City.
Billings.	Hamilton.	Plains.
Bozeman.	Harlowton.	Plentywood.
Bridger.	Havre.	Red Lodge.
Butte.	Helena.	Somers.
Columbus.	Joliet.	Stevensville.
Como.	Kalispell.	Terry.
Dillon.	Laurel.	Troy.
Dooley.	Lewistown.	Woodside.
Edgar.	Livingston.	

Owing to the perishable character of plants and plant products the packages containing such matter must be given prompt attention.

Any failure of compliance with the foregoing instructions, or with the provisions of section 478¼, Postal Laws and Regulations, coming to the attention of any postmaster, should be reported to the Third Assistant Postmaster General, Division of Classification.

A. M. DOCKERY,
Third Assistant Postmaster General.

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